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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,782	01/03/2007	Hristov Lillian Ivanchev	8119-97327	6107

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EXAMINER
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KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1793

MAIL DATE	DELIVERY MODE
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12/28/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,782	<b>Applicant(s)</b> IVANCHEV ET AL.	
	<b>Examiner</b> Kevin P. Kerns	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 10-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☒ Claim(s) 1,3 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/28/06</u> .                                                 | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicants' election without traverse of Group I (claims 1-9) in the reply filed on October 15, 2009 is acknowledged.

### ***Specification***

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

In this instance, the specification lacks section headings.

***Claim Objections***

3. Claims 1, 3, and 5 are objected to because of the following informalities: in the 3<sup>rd</sup> line of the claim 1, add “of” after “charge” for clarity. In the 4<sup>th</sup> line of claim 3, and in the 2<sup>nd</sup> line of claim 5, add “alloy” after “semi-solid metal” to obtain proper antecedent basis. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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6. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carden et al. (US 5,865,238) in view of Matsuura et al. (US 5,718,280).

Regarding independent claim 1, Carden et al. disclose a process and apparatus for die casting of metal alloy matrix materials from a semi-solid billet (abstract; column 1, lines 7-11 and 60-67; column 2, lines 1-31; column 3, lines 2-67; column 4, lines 1-15 and 39-67; column 5, lines 1-67; column 6, lines 1-5; and Figures 3-6), in which the process includes the following steps:

providing a contained charge of semi-solid metal alloy (billet 1) to form a cast article upon injecting into die cavity 10 (see Figures 3-6);

introducing a charge (billet 1) of a metal alloy into a container (sleeve 5); and

allowing the metal alloy to reach a semi-solid state (column 5, lines 4-62), such that the container (sleeve 5) includes the following structural features:

an elongate cylindrical body extending along the horizontal axis of sleeve 5 (see Figures 3-6);

a mouth (adjacent plunger tip 7) at a first end of the body;

an opening (adjacent gate 9) at an opposite second end of the body remote from the mouth; and

a closure member (plunger tip 7) configured to close the opening (adjacent gate 9) when in a fully injected position and configured to be displaceable along an interior volume of the body from the second end to the first end (when being retracted), such that the charge (billet 1) of semi-solid metal alloy is displaced by application of injection pressure from the closure member (plunger tip 7), such that the closure member 7

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would have a higher melting point than the highest temperature applied to the charge (billet 1), as one of ordinary skill in the art would have recognized, due to the desirability of the plunger tip 7 to remain solid (unmelted by high temperature materials) without replacement or repair, thus having a longer life in the die casting system.

Regarding claims 2, 8, and 9, Carden et al. disclose that the closure member (plunger tip 7) is dimensioned to be displaceable through the mouth of the container (sleeve 5) so as to be locatable with a friction fit inside the interior volume of the body of the container 5 (column 5, lines 4-62; and Figure 3).

Regarding claim 3, Carden et al. disclose that the process of forming the article (in the die cavity 10) include providing a contained charge (billet 1) of a semi-solid metal alloy (of independent claim 1), and displacing the charge of semi-solid metal alloy from the container (sleeve 5) and forming the charge into a desired shape in die cavity 10 (column 5, lines 47-62; and Figures 3-6).

Regarding claim 4 and independent claim 6, and in referring to the properties of the container set forth in the above discussion of independent claim 1, Carden et al. disclose that the casting container (sleeve 5) is used for containing a charge (billet 1) of a semi-solid metal alloy. Although Carden et al. do not specifically state that the container is a "rheo-casting" container, one of ordinary skill in the art would have recognized that the structural features (as applied to independent claim 1 above) are capable of holding metal alloy in solid, semi-solid, and liquid (molten) states. Moreover, Carden et al. disclose a "rheocast billet" (column 2, lines 5-12) for use in semi-solid metal alloy die casting. As a result, one of ordinary skill in the art would consider the

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casting container (sleeve 5) to be a "semi-solid casting" container, "rheo-casting" container, "molten metal casting" container etc., since this container is capable of holding various states of metal and operable to conduct a process of rheo-casting.

Regarding claim 5, Carden et al. disclose that the charge (billet 1) of semi-solid metal is displaced (via closure member, or plunger tip 7) from the elongate body of the container (sleeve 5) and through the mouth when the plunger tip 7 is retracted.

Regarding claim 7, Carden et al. disclose that the side wall of the container (sleeve 5) defines a circular cylindrical interior surface (Figures 3-6).

Carden et al. do not specifically disclose that the closure member is the same as or similar to the semi-solid metal alloy to be used in casting (independent claims 1 and 6), that the process includes the step of introducing molten metal alloy into the container to be cooled to a semi-solid state (independent claim 1), and that the closure member is disc-shaped (claim 7).

However, Matsuura et al. disclose a die casting process and apparatus (abstract; column 2, lines 23-67; column 3, lines 1-54; column 6, lines 20-67; column 7, lines 1-51; column 8, lines 1-4; and Figures 5-7), in which the process and apparatus include introducing a charge of molten metal 14 from ladle 13 (Figure 5) into an upwardly-facing opening 21a (Figure 7) of a molten metal pack 20 (made of pure aluminum or a higher melting point material – see Second Preferred Embodiment in column 6, lines 20-59; and Figures 5-7) within a plunger sleeve 4, such that the molten metal 14 and molten metal pack 20 are similar materials and subsequently compressed (Figure 6) and cooled from a liquid state through a semi-solid state prior to solidification in the mold

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cavity 3 (Figure 6), and the left and right edges 22 of the molten metal pack are disc-shaped (Figure 7), with these additional features being advantageous for obtaining high-quality die-cast products without gas defects and without directly contacting molten metal with the plunger sleeve (since the molten metal pack, or closure member, is positioned therebetween), thus inhibiting molten metal from damaging the plunger sleeve (abstract; column 3, lines 32-41; and column 7, lines 32-48).

It would have been obvious to one of ordinary skill in the art at the time the applicants' invention was made to modify the process and apparatus for die casting of metal alloy matrix materials from a semi-solid billet, as disclosed/suggested by Carden et al., by using the closure member having a disc-shape and of similar material to the alloy to be used in casting, and the process of introducing molten metal alloy into the container to be cooled to a semi-solid state, as taught by Matsuura et al., in order to obtain high-quality die-cast products without gas defects and without directly contacting molten metal with the plunger sleeve (since the molten metal pack, or closure member, is positioned therebetween), thus inhibiting molten metal from damaging the plunger sleeve (Matsuura et al.; abstract; column 3, lines 32-41; and column 7, lines 32-48).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin P. Kerns whose telephone number is (571)272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin P. Kerns  
Primary Examiner  
Art Unit 1793

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Primary Examiner, Art Unit 1793  
December 4, 2009